WC094

UF UNIVERSITY of FLORIDA
IFAS Extension

Digital Photography and Photographic Editing[1]

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This EDIS publication, focusing on the basics of digital photography and photographic editing, is the first of a three-part series on taking good digital photos for your local Extension program. This series includes publications on the basics of digital photography and editing as well as photo composition.

Introduction

The old saying goes, "A picture is worth a thousand words." That may very well be true. Seeing an image of someone winning an award, for example, can be more exciting than reading about it in a news story. Since it seems that almost everyone has access to a digital camera—either with an actual digital camera or with a cell phone that takes pictures—just about everyone thinks they are photographic experts. Simply owning a camera, however, does not make someone an expert. It takes practice to be able to take photographs that tell great stories.

Because not everyone has the same type of camera, this series of publications on photography focuses on general techniques, rather than specifics on how to operate a particular digital camera. This series introduces some of the basics of digital photography and photographic editing.

Fig. 1. Learning the basics of digital photography will help you take great photos for both your personal use and Extension activities.

How Digital Photography Works

Digital cameras have, by and large, replaced film cameras. Digital cameras provide options that film cameras do not. With digital cameras, you can immediately view photos that you have taken. You can take several photos, view them in the camera, and then decide which ones to keep and which ones to delete. Photo files can be shared easily over e-mail or on Web and Facebook pages. You can print only the photos you want, and, because the photos are digital files, they can be stored easily on CDs, hard drives,

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or other storage devices where the files will not degrade. In the photo editing process, a digital photo image can be modified and manipulated much more easily and quickly than traditional film negatives. One disadvantage of digital cameras is that because digital cameras are so small, they are easily dropped. However, because they are inexpensive, it is usually more cost-effective to buy a new one than to have a broken one repaired.

Digital cameras store images in the form of millions of tiny picture elements called *pixels*, which is short for "picture elements." A pixel, simply put, is a single point of light on the screen of a monitor. The term *megapixel*, which means "one million pixels," is often used in connection with digital cameras. A camera that shoots photographs of 6.2 megapixels shoots digital images of roughly 6.2 million pixels at the highest resolution.

A number of cameras allow you to take photographs that are many megapixels in size, and these cameras can be expensive. If the camera is to be used mainly to take photographs that are about 4 x 6 inches, a 3- or 4-megapixel camera is probably all that is needed. To take 8 x 10-inch photos, the camera should be at least 5 megapixels. For advanced photography, you may need a camera that takes photos of 8 or more megapixels. Most cell phone cameras take 1- to 2-megapixel photographs. If all of the images will be placed on the Web, a camera with fewer than 3 megapixels may be suitable, but if the images will be used in publications, use a camera of at least 5 megapixels or more. Most consumer-grade cameras shoot at least 5-megapixel photographs.

In addition to determining how many megapixels are needed, it is also necessary to determine if you need a camera that has interchangeable lenses (zoom, telephoto, and wide-angle lenses) or a camera with a built-in zoom lens. Cameras made for interchangeable lenses are called SLR cameras, for "single lens reflex." Digital cameras with interchangeable lenses are called DSLR ("digital single lens reflex"). Cameras with interchangeable lenses cost more, but you can get just the right lens for just the right photo. For standard photos, a camera with a built-in zoom lens may be all you need. Almost all digital cameras have built-in flashes, too.

LCD monitors are small color screens built into most cameras. Most have brightness adjustments that can either be changed manually or automatically. These screens range between 1 and 3 inches in size. Viewfinders are smaller monitors built into digital cameras. An advantage to using a viewfinder instead of an LCD monitor is that a viewfinder shows the same area as the camera's zoom lens, so you can capture the same area that you see in the viewfinder.

A tripod or monopod are useful pieces of camera equipment. Also, it is a good idea to have a camera bag packed with extra batteries and memory cards. The camera bag also can carry extra camera lenses for cameras with interchangeable lenses.

Resolution and Compression

Digital camera resolution is usually measured in megapixels, a raw counting of the number of pixels in the digital image created by the camera. Although the photographs taken with low-resolution cameras (1 to 2 megapixels) are fine for photographs that will be viewed only on television or computer screens, they do not work well for print documents. Cameras with higher resolution (preferably 5 megapixels or more) are necessary for print-quality photographs.

A number of standard digital cameras allow you to save photographs at varying levels of resolution—"Basic," "Fine, and "Superfine" or possibly "Good," "Better," and "Best." The camera manual should describe exactly how to change the resolution and how many pixels are associated with each setting. High-resolution images take up more space on the camera's memory card. High-resolution photographs have low compression rates, which result in larger file sizes and better-looking images.

The basic rule is that if photographs will be used for print documents, save at the highest resolution possible. The resolution can always be lowered during the photographic editing process if necessary, but it's not possible to increase the resolution of an image that was saved at a low resolution without the image looking distorted. Low-resolution images are sufficient for images that will only be viewed on computer screens—such as on the Web or on Facebook pages.

To output the finished photograph, the output resolution must be set. This is done in *pixels per inch* (ppi). For printed materials (publications or actual photo prints), the photograph needs to be output at no less than 300 ppi. If the photograph is going to be placed on the Web or e-mailed, the resolution can be as low as 72 ppi because a computer screen can only show 72 ppi resolution.

Also keep in mind that a digital camera's aspect ratio may be different than that of a traditional film camera. A film camera's aspect ratio is 3:2, which means the image is 3 units wide by 2 units tall. This is why the 4 x 6-inch print emerged as a standard size. Many—but not all—digital cameras have an aspect ratio of 4:3, which means the image is 4 units wide by 3 units tall, just like the aspect ratio of a computer monitor. To get a 4 x 6-inch image from a digital camera with a 4:3 aspect ratio, the photograph will need to be cropped in the photo editing stage.

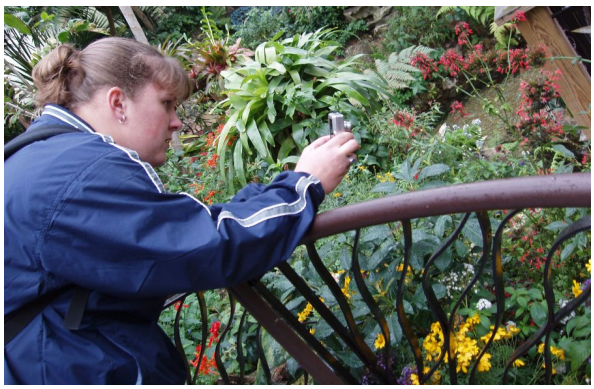

Fig. 2a. Photograph shot with a standard film camera's aspect ratio of 3:2. Notice the difference in size between this photograph and the photograph in Fig. 2b.

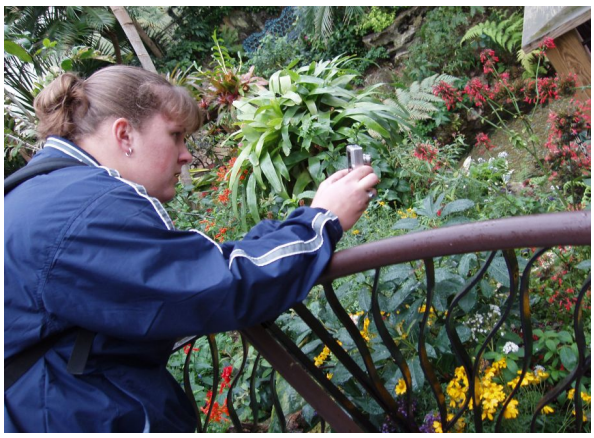

Fig. 2b. Photograph shot with a regular digital camera's aspect ratio of 4:3. Notice the difference in size between this photograph and the photograph in Fig. 2a.

Selecting a File Format

Your camera may offer a choice of file formats for saved images. The selected format determines how the camera records and stores all of the bits of data that make up a digital photo. Several formats have been developed for digital images, but the most popular for digital camera manufacturers are JPG, TIFF, and RAW.

JPG (pronounced *JAY-peg*) is short for "Joint Photographic Experts Group," the organization that developed this file format. JPG is the leading photographic file format because it takes Web-friendly photos; all Web browsers and e-mail programs can display a JPG image. JPGs also are smaller in file size than other formats. The disadvantage of JPG images is that the images are saved with a process that eliminates, or compresses, some image data. If you record your images as JPGs, you should try to save the image at the highest resolution possible to minimize the compression.

TIFF stands for "tagged image file format." TIFF files are much larger than JPGs because TIFFs do not compress files very much. TIFFs cannot be displayed on some Web browsers. A TIFF file must usually be opened in a photo editing program and converted to a JPG before the image can be shared on the Web. TIFF is for photographers who are concerned with maintaining image quality. For most amateur photographers, though, TIFFs are not used very often. TIFF is the preferred format for image files for print publications. More information about how to save edited files is provided in the final installment of this series, *Photo Editing* http://edis.ifas.ufl.edu/WC096.

The last image format is RAW. RAW is not a standard format, such as JPGs and TIFFs. Each camera manufacturer uses different specifications for its own RAW format. A RAW file records data straight from the camera's sensor, just the way it looks on the sensor, onto the camera's data card. The files are uncompressed, meaning they are larger than JPG files. Professional photographers tend to use the RAW format.

Light, Colors, and White Balance

Digital cameras can be adjusted for different types of light. Light sensitivity is measured using a scale called ISO, for "International Standards Organization." Most digital cameras provide a choice of ISO values, usually 100, 200, 400, and so on. Higher-end cameras have even more choices. As the ISO value increases, the camera becomes more sensitive to light. Therefore, in a low-light situation, photographs should be shot using a high (800 to 1,600) ISO value. However, recording images at high ISO values all the time is not recommended. Higher ISO values produce images that look grainier than images shot at lower ISOs. Most cameras' automatic ISO features yield good results.

In addition to paying attention to the amount of light, consider the light source. Different kinds of light have different color qualities, commonly called *color temperature*. This is a way of saying that the light sources contain different amounts of red, green, and blue light. For example, sunlight tends to be blue, a regular light bulb (incandescent) tends to be more yellow or orange, and a fluorescent bulb tends to be green. Your eyes adjust to changes in color temperature so the colors with different light sources look the same, but digital cameras do not adjust so easily. A camera must be white balanced to correct color temperature problems.

White balancing tells the camera what combination of red, green, and blue light it should perceive as white, given a particular lighting condition. Most cameras have auto white balance features, but this feature can sometimes become confused, particularly if the scene being shot features a single dominant color or includes different types of light (sunlight streaming into a room lit with fluorescent light). In this situation, it may be necessary to adjust the white balance manually. Most cameras include white balance presets for normal types of light: daylight, daylight with clouds, incandescent, fluorescent, and flash. If your camera does not offer white balance adjustments, you can remove unwanted colors in the photo editing stage.

Additional Information

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